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For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: MODIFIED ZIEGLER CATALYST, PROCESS FOR PREPARING IT AND PROCESS FOR PREPARING POLY-1-  
OLEFINS IN ITS PRESENCE

(57) Abstract: The invention relates to a modified Ziegler catalyst for preparing a poly-1-olefin in suspension, in solution or in the  
gas phase, which catalyst comprises the reaction product of a magnesium alkoxide (component a) with a transition metal compound  
(component b) and an organometallic compound (component c) together with an additional component (d) comprising a compound  
of the chemical formula M - R<sub>x</sub>, where M is an element of main group IV of the Periodic Table, R is halogen or an organic radical  
such as alkyl having from 1 to 10 carbon atoms, oxyalkyl having from 1 to 10 carbon atoms, cycloalkyl having from 4 to 8 carbon  
atoms in the ring and, if desired, from 1 to 6 substituents R' on the ring, aryl having from 6 to 10 carbon atoms in the aromatic and, if  
desired, from 1 to 6 substituents R' on the aromatic, where R' is a halogen or an alkyl radical having from 1 to 4 carbon atoms or an  
OH group or an NO<sub>2</sub> group or an oxyalkyl radical having from 1 to 4 carbon atoms, and x is an integer from 1 to 4. The invention also  
relates to a process for preparing the Ziegler catalyst and to the homopolymerization or copolymerization of 1-olefins in its presence.



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## INTERNATIONAL SEARCH REPORT

International application no.

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A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 C08F10/00 C08F4/64

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 C08F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 522 424 A (TOSOH CORP) 13 January 1993 (1993-01-13) page 3, line 8 - line 18 page 5, line 33 page 5, line 50 - page 6, line 38 page 6, line 31 - line 33 page 15; example 30 -----	1-16
A	WO 01/038405 A (BASELL POLYOLEFINE GMBH ;ALT FRANK (DE); BOEHM LUDWIG (DE); SCHOEN) 31 May 2001 (2001-05-31) * the whole document *	1-16
A	EP 0 607 773 A (HOECHST AG) 27 July 1994 (1994-07-27) * the whole document *	1-16

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

12 November 2003

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**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1 (part), 2-16 (part 1)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1 (part 1) 2-16 (part 1)

Ziegler catalyst comprising: a magnesium alkoxide (component a), a transition metal compound (component b), an organometallic compound (component c), a compound of the chemical formula  $M-R(x)$ , where M is an element of the main group IV and R is halogen  
Process according to claim 8,12 with the above described catalyst

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2. claims: 1 (part 2) 2-16 (part 2)

Ziegler catalyst comprising: a magnesium alkoxide (component a), a transition metal compound (component b), an organometallic compound (component c), a compound of the chemical formula  $M-R(x)$ , where M is an element of the main group IV and R is an organic radical having from 1-10 carbon atoms  
Process according to claim 8,12 with the above described catalyst

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3. claims: 1 (part 3), 2-16 (part 3)

Ziegler catalyst comprising: a magnesium alkoxide (component a), a transition metal compound (component b), an organometallic compound (component c), a compound of the chemical formula  $M-R(x)$ , where M is an element of the main group IV and R is oxyalkyl.  
Process according to claim 8,12 with the above described catalyst

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4. claims: 1 (part 4), 2-16 (part 4)

Ziegler catalyst comprising: a magnesium alkoxide (component a), a transition metal compound (component b), an organometallic compound (component c), a compound of the chemical formula  $M-R(x)$ , where M is an element of the main group IV and R is oxyalkyl.  
R is cycloalkyl having from 4-8 carbon atoms in the ring

Process according to claim 8,12 with the above described catalyst

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## INTERNATIONAL SEARCH REPORT

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